REMARKS

Claims 1-29 and 36-45 are pending. By this Amendment, the specification and claims 1, 14, 24-25, 27, and 36-37 are amended. Support for the claims can be found throughout the specification, including the original claims, and the drawings. Reconsideration in view of the above amendments and following remarks is respectfully requested.

Entry of the amended claims is proper under 37 C.F.R. §1.116 since the amendments: (1) place the application in condition for allowance for the reasons discussed herein; (2) do not raise any new issues requiring further search and/or consideration since the amendments amplify issues previously discussed throughout prosecution without incorporating additional subject matter; (3) satisfy a requirement of form asserted in the previous Office Action; and/or (4) place the application in better form for appeal, if necessary. Entry is thus requested.

The Office Action objected to the specification because of an informality. The Examiner's comments have been addressed in amending the specification. Accordingly, the objection should be withdrawn.

The Office Action objected to claim 14 because of an informality. The Examiner's comments have been addressed in amending claim 14. Accordingly, the objection should be withdrawn.

The Office Action rejected claims 1, 3-7, 10-12, 15, 20, 24, 36, and 38-41 under 35 U.S.C. §103(a) as being unpatentable over Freier et al. (hereinafter "Freier"), U.S. Patent No. 6,301,418. The rejection is respectfully traversed.

The Office Action states that:

> Freier et al. discloses an apparatus comprising one or more optical fibers or waveguides (Fig. 1, #100). However, Freier et al. does not disclose one or more tap structures formed in the waveguides so that, when light travels through, a desired illumination pattern is created by scattering, diffraction, reflection and/or refraction of portions of light through the tap in this embodiment. Freier et al. teaches one or more tap strictures (Fig. 5a, #108) formed in the waveguide so that, when light travels through, a desired illumination pattern (Fig. 7-9) is created by scattering, diffraction, reflection and/or refraction of portion of light (col. 5, lines 15-19) through the tap in another embodiment. It would have been obvious, to one having ordinary skill in the art at the time the invention was made to have the taps of Freier et al. with the device of Freier et al., since one would be motivated to have these taps to increase scattering of light (col. 5, lines 14-19) in the illumination device as implies from Freier et al.

However, independent claim 1 has been amended to recite, *inter alia*, one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, *the one or more modeled tap structures direct the light in predetermined directions so as to create* a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light through the one or more modeled tap structures formed by using pattern parameters determined by modeling the desired illumination pattern. Independent claim 24 has been amended to recite, *inter alia*, a continuous modeled tap structure formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, *the continuous modeled tap structure directs the light in predetermined directions so as to create* a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light through the continuous tap structure formed by using pattern parameters determined by modeling the desired illumination pattern.

In contrast, Freier discloses an optical waveguide with diffuse light extraction. Freier teaches roughening an inner surface of a cladding in a non-uniform manner to provide for extraction of diffused light. See, for example, Figure 3, which shows a core 102 with cladding 104. The inner surface of cladding 104 is roughened to provide a randomly displaced core/cladding interface, shown as indentations 108 in Figure 3. As stated in column 4, lines 39-40 of Freier, "[t]he light leaving through the cladding is diffuse because it is not directed in any preferred direction." Thus, Freier teaches diffuse light extraction methods that provide light scattered in random directions. Freier further teaches that there are a variety of applications that require diffuse rather than "directed" light, including such applications as lighted display signs, lamps for offices or other work places, neon lighting, and light sources such as incandescent and electrical arc sources. Freier teaches roughening the cladding by sand blasting, brush abrasion, or vibration of particles provided within the cladding. While Freier does disclose one embodiment in which grooves are provided in the inner surface of the cladding, Freier notes that "[t]his configuration closely resembles the pits and craters described in the previous embodiment," and likewise is designed to scatter light efficiently in no particular direction. Thus, as the Freier apparatus are designed to scatter light in no particular direction, Freier does not disclose or suggest one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, *the one or more modeled tap structures direct the light in predetermined directions so as to create* a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light through the one or more modeled tap structures formed by using pattern

parameters determined by modeling the desired illumination pattern, as recited in independent claim 1, or a continuous modeled tap structure formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, *the continuous modeled tap structure directs the light in predetermined directions so as to create* a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light through the continuous tap structure formed by using pattern parameters determined by modeling the desired illumination pattern, as recited in independent claim 24..

Further, the Examiner states that "[w]ith regard to the taps being modeled or formed by using pattern parameters determined by modeling the desired illumination pattern, the method of forming a device is not germane to the issue of patentability of the device itself," and "[t]herefore, these limitations have not been given patentable weight." However, the Examiner is directed to MPEP 2113 which states in pertinent part that "[t]he structure implied by the process steps should be considered...especially where the product can only be defined by the process steps by which the product is made, or where the manufacture process steps would be expected to impart distinctive structural characteristics to the final product." In the present case, the process of forming tap structures using pattern parameters determined by modeling a desired illumination pattern results in distinctive structural characteristics, that is, one or more optical fibers or other waveguides capable of directing light in predetermined directions so as to create the desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light through the one or more modeled tap structures.

Accordingly, for the reasons set forth above, the rejection of independent claims 1 and 24 should be withdrawn. Dependent claims 3-7, 10-12, 15, 20, 36, and 38-41 are allowable at least for the reasons discussed above with respect to independent claims 1 and 24, from which they respectively depend, as well as for their added features.

The Office Action rejected claims 2, 8, and 9 under 35 U.S.C. §103(a) as being unpatentable over Freier, in view of McGaffigan, U.S. Patent No. 6,031,958. The rejection is respectfully traversed.

McGaffigan is merely cited for allegedly teaching a generally spherical pattern of light and taps extending radially around or continuously circular. Thus, McGaffigan fails to overcome the deficiencies of Freier discussed above. Accordingly, dependent claims 2 and 8-9 are allowable at least for the reasons discussed above with respect to independent claim 1, from which they depend, as well as for their added features.

The Office Action rejected claim 13-14 under 35 U.S.C. §103(a) as being unpatentable over Freier, in view of Koch, U.S. Patent No. 4,878,157. The rejection is respectfully traversed.

Koch is merely cited for allegedly teaching a light source selectively controllable and light sources having varying illumination powers, and thus fails to overcome the deficiencies of Freier discussed above. Accordingly, dependent claims 13-14 are allowable at least for the reasons discussed above with respect to independent claim 1, from which they depend, as well as for their added features.

The Office Action rejected claims 16-19 under 35 U.S.C. §103(a) as being unpatentable over Freier, in view of Mori, U.S. Patent No. 4,389,085. The rejection is respectfully traversed.

Mori is merely cited for allegedly teaching incoherent, visible, UV, and infrared light, and thus fails to overcome the deficiencies of Freier discussed above. Accordingly, dependent claims 16-19 are allowable at least for the reasons discussed above with respect to independent claim 1, from which they depend, as well as for their added features.

The Office Action rejected claims 21-23 under 35 U.S.C. §103(a) as being unpatentable over Freier, in view of Izumi et al. (hereinafter "Izumi"), U.S. Patent No. 5,528,399. The rejection is respectfully traversed.

Izumi is merely cited for allegedly teaching semiconductor, high power, or light emitting diodes, and thus fails to overcome the deficiencies of Freier discussed above. Accordingly, dependent claims 21-23 are allowable at least for the reasons discussed above with respect to independent claim 1, from which they depend, as well as for their added features.

The Office Action rejected claims 25, 26, 37, 42, and 43 under 35 U.S.C. §103(a) as being unpatentable over Allen et al. (hereinafter "Allen"), U.S. Patent No. 5,500,913, in view of Freier and Imen et al. (hereinafter "Imen"). The rejection is respectfully traversed.

Independent claim 25 has been amended to recite, *inter alia*, one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, *the one or more modeled tap structures direct the light in predetermined directions so as to optimize* an amount of the light output through the one or more modeled tap structures, wherein the one or more modeled tap structures are formed by using pattern parameters determined by modeling an illumination pattern configured for optimized light output.

As stated in the reply filed March 28, 2003, Allen discloses an apparatus and method of fabricating directional fiber optic taps and sensors and there would have been no motivation to modify the apparatus of Allen in view of Freier, which is directed to an optical waveguide with diffuse light extraction. Allen teaches tapping light at individual points along the length of an optic fiber to sense the signal carried in the fiber or the loss at that point due to misalignment of the fiber or bending and straining of the fiber. Freier, in contrast, teaches diffuse light extraction methods that provide light scattered in random directions. As Allen is directed to tapping light at single points along a length of an optical fiber to sense loss, and Freier teaches diffuse light extraction for illumination purposes, there would have been no motivation to modify Allen in view of Freier.

Further, even if there were motivation to combine Allen and Freier as suggested by the Examiner, with which contention Applicant respectfully disagrees, there would have been no motivation to modify the combination further in view of Imen. The Examiner states that "[i]t would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have optimization of Imen et al. with the suggested apparatus of Allen et al. in view of Freier et al, since one would be motivated to have optimization for more direction output as implied from Imen et al." However, Allen is directed to tapping light at single points along a length of an optical fiber to sense loss. Further, the Freier apparatus is designed to scatter light in no particular direction. Neither suggests a need for optimization of output light, or even for a particular amount of output light in a particular pattern or direction. Thus, there would have been no motivation to modify the Allen-Freier combination as suggested by the Examiner.

Thus, it is clear that the proposed combination is based in impermissible hindsight gleaned from Applicant's own disclosure.

Further, as Allen is directed to tapping light at single points along a length of an optical fiber to sense loss, the Freier apparatus is designed to scatter light in no particular direction, as discussed above, and Imen is merely cited for teaching optimization, the references, taken alone or in combination, fail to disclose or suggest one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, *the one or more modeled tap structures direct the light in predetermined directions so as to optimize* an amount of the light output through the one or more modeled tap structures, wherein the one or more modeled tap structures are formed by using pattern parameters determined by modeling an illumination pattern configured for optimized light output.

Additionally, as set forth above, the process steps by which the one or more tap structures are formed should be given patentable weight as the process of forming tap structures using pattern parameters determined by modeling an illumination pattern configured for optimized light output results in distinctive structural characteristics, that is, one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, *the one or more modeled tap structures direct the light in predetermined directions so as to optimize* an amount of the light output through the one or more modeled tap structures.

Accordingly, the rejection of independent claim 24 over the Allen-Freier-Imen combination should be withdrawn. Dependent claims 26, 37, 42, and 43 are allowable at least for the reasons discussed above with respect to independent claim 25, from which they depend, as well as for their added features.

The Office Action rejected claims 27-28 and 44-45 under 35 U.S.C. §103(a) as being unpatentable over Allen, in view of Freier. The rejection is respectfully traversed.

Independent claim 27 has been amended to recite, *inter alia*, one or more modeled tap structures formed in the one or more photon channeling structures configured so that, when the photons travels through said photon channeling structures, *the one or more modeled tap structures direct the light in predetermined directions so as to create* a desired pattern by scattering, diffraction, reflection and/or refraction of portions of the photons through the one or more modeled tap structures formed by using pattern parameters determined by modeling the desired pattern.

As stated in the reply filed March 28, 2003, Allen discloses an apparatus and method of fabricating directional fiber optic taps, sensors and there would have been no motivation to modify the apparatus of Allen in view of Freier, which is directed to an optical waveguide with diffuse light extraction. Allen teaches tapping light at individual points along the length of an optic fiber to sense the signal carried in the fiber or the loss at that point due to misalignment of the fiber or bending and straining of the fiber. Freier, in contrast, teaches diffuse light extraction methods that provide light scattered in random directions. As Allen is directed to tapping light at single points along a length of an optical fiber to sense loss, and Freier teaches diffuse light extraction for illumination purposes, there would have been no motivation to

modify Allen in view of Freier. Thus, it is clear that the proposed combination is based in impermissible hindsight gleaned from Applicant's own disclosure.

Further, as Allen is directed to tapping light at single points along a length of an optical fiber to sense loss, and the Freier apparatus is designed to scatter light in no particular direction, as discussed above, the references, taken alone or in combination, fail to disclose or suggest one or more modeled tap structures formed in the one or more photon channeling structures configured so that, when the photons travels through said photon channeling structures, *the one or more modeled tap structures direct the light in predetermined directions so as to create* a desired pattern by scattering, diffraction, reflection and/or refraction of portions of the photons through the one or more modeled tap structures formed by using pattern parameters determined by modeling the desired pattern.

Additionally, as set forth above, the process steps by which the one or more tap structures are formed should be given patentable weight as the process of forming one or more tap structures using pattern parameters determined by modeling a desired pattern results in distinctive structural characteristics, that is, one or more modeled tap structures formed in the one or more photon channeling structures configured so that, when the photons travels through said photon channeling structures, *the one or more modeled tap structures direct the light in predetermined directions so as to create* a desired pattern by scattering, diffraction, reflection and/or refraction of portions of the photons through the one or more modeled tap structures.

Accordingly, the rejection of independent claim 27 over the Allen-Freier combination should be withdrawn. Dependent claims 28 and 44-45 are allowable at least for the reasons

discussed above with respect to independent claim 27, from which they depend, as well as for their added features.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, **Carol L. Druzbick**, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
FLESHNER & KIM, LLP

Mark L. Fleshner
Registration No. 34,596
Carol L. Druzbick
Registration No. 40,287

P.O. Box 221200
Chantilly, VA 20153-1200
703 766-3701 MLF:CLD/ms/kam
Date: December 18, 2003

Please direct all correspondence to Customer Number 34610